



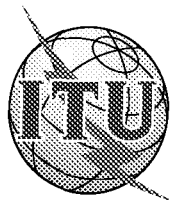
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Additions to the Handbook on Telephonometry



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ADDITIONS TO THE HANDBOOK ON TELEPHONOMETRY

CONTENTS

	<i>Page</i>
Addition to § 2.3.6 of the Handbook on Telephonometry	1
Addition to § 3.2.5 of the Handbook on Telephonometry	7
Addition to § 4.8 of the Handbook on Telephonometry	9

SOME EFFECTS OF SIDETONE

1 Introduction

Over a number of years, sidetone has been studied and some important conclusions have been reached from the point of view of the subscriber in his role as both talker and listener. These conclusions relate to the effect of sidetone on a subscriber as he hears his own voice, the way his talking level changes as a result and some effects of sidetone when the subscriber is listening in conditions of moderate to high-level room noise. These effects are summarized in Figures 1 and 3.

The relationship between talker and listener sidetone for a given telephone depends primarily on two factors:

- a) the geometry of its handset; and
- b) whether or not there are any non-linear gain or loss characteristics in the sidetone path.

Some guidance for telephone set designers is provided in clause 4.

Some information is also provided concerning the increasingly frequent occurrence of short delay talker echo, which may be perceived as unpleasant talker sidetone.

2 Talker sidetone

Figure 1 shows that there is a preferred range for sidetone when the subscriber is talking under quiet conditions, and that the difference between the sidetone being objectionable or too quiet is of the order of 20 dB. (These results were obtained from talking-only tests and need to be confirmed by conversation tests.) The preferred range lies between 7 and 12 dB, STMR (Sidetone Masking Rating – Recommendation P.76 [1]).

The acceptable range is wider and lies between an STMR of 1 dB and 17 dB (although it must be stated that increasing STMR to a value greater than 17 dB is likely to affect only the talking level, and that only marginally). This range corresponds to the difference between the two curves at the 50% appraisals level. It is not proposed that the 17 dB figure should in any way be considered a maximum value. However, for an STMR above 20 dB, the connection sounds “dead”.

Figure 2 shows the way in which the talking level changes with sidetone level. These results were obtained by means of conversation tests, for a connection close to the preferred overall loss. For telephone connections where the OLR is in the preferred range, the STMR values may be positioned in the preferred STMR range given above. However, on high-loss connections the STMR value should be close to, or even exceed, 12 dB to encourage the subscriber to speak louder. On low-loss connections, the STMR value may be sometimes permitted to become less than 7 dB, but only rarely should it become as low as 1 dB, e.g. telephone sets with receive volume control. Recommendation G.121 [2] interprets those results for transmission planning purposes.

The speech voltage will also be a function of room noise level. For modern telephones with linear transmitters, it may be desirable to have the STMR value in the range from 10 to 15 dB if it is expected that telephones will be used in noisy environments.

3 Listener sidetone

High room noise in the subscriber’s environment disturbs the received speech in two ways:

- i) noise being picked up by the handset microphone and transmitted to the handset receiver via the electric sidetone path;
- ii) noise leaking past the earcup at the handset receiver.
